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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/023,723	12/21/2001	Biju Chandran	219.40780X00	5137
20457	7590	10/20/2003	EXAMINER MITCHELL, JAMES M	
ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-9889			ART UNIT 2827	

DATE MAILED: 10/20/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/023,723

Applicant(s)

CHANDRAN ET AL.

Examiner

James M. Mitchell

Art Unit

2827

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED. (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 June 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-5,7 and 9-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-5,7 and 9-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s) _____.
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Election

1. Claim 19, 21, 22 and 24-26 withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected invention, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper filed December 21, 2201.
2. Applicant traverses the restriction on the grounds that that claim 1 recited that a bump on a die is a "reflowed solder bump," and that examiner's previous examination of both groups show no undue burden. First, although there is a process limitation in claim 1, the process does not impart structural characteristics different than that, which can be achieved through other known bonding steps, such as a eutectic bonding step by pressure. Secondly, while examiner proceeded to initially examine both groups in attempt to expedite prosecution, examination is not a waiver of an examiner's ability to restrict. It has been determined that further search would cause an undue burden as set out in examiner's restriction pursuant to M.P.E.P 800. As such, applicant's traversal is deemed unpersuasive and the restriction deemed proper.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1,3-5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Milewski (US 6,330,967).

6. Milewski (Fig 5A) discloses a substrate (21) a die (10), a plurality of interconnections between the substrate and a die (10), wherein respective ones of the interconnections include a relatively low melting temperature (39) and yield strength solder on the die, a relatively higher melting temperature and electrically conductive, copper material (51) that extends a distance above the substrate and therefore is a standoff, in the form of a bump or column on the substrate, and an inherent soldered joint connecting the solder to the electrically conductive material, wherein the relatively higher melting temperature and electrically conductive material (51) on the substrate is formed as a standoff extending above a surface of the substrate, and a top surface of the standoff is inherently wetted by the solder to form the solder joint (Abstract, reflow; Column 5, Lines 42-43); wherein the standoff has an inherent yield strength of 350-450 Mpa (applicant spec. 6, via conventional interconnect scheme)

7. Milewski does not appear to explicitly disclose a low melting temperature and yield strength reflowed solder bump.

8. With respect to claim 1 product by process claim "reflowed", the prior art structure is the same as the claimed invention. "[E]ven though product-by-process claims are limited by and defined by the process, determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985).

9. Claims 7 and 9-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Milewski (US 6,330,967) in combination with Oxman (6,395,124).

10. Milewski discloses the elements stated in paragraph 6 and further that said substrate is a PCB that has in inherent inter layer dielectric material under the interconnection/ solder connection (via PCB comprised of dielectric laminates under interconnection) and that said die is silicon, and a plurality (Fig 4) of non-melting standoff (via copper) at the solder liquidus temperature upstanding where the joints connect the die to tops of respective ones of the standoff elements.

11. Milewski does not appear to disclose that the CTE of the substrate is at least 15 ppm/ C and the CTE of the die is 2.7 ppm/C less than that of the substrate, such that the CTE of the substrate is more than two times greater the CTE of the die.

12. Oxmann teaches a ceramic substrate (Col. 6, Lines 38-40).

13. It would have been obvious to one of ordinary skill in the art to form the substrate of Milewski of ceramic in order to form a PCB as required by Milewski, such that the CTE of the substrate is at least 15 ppm/ C and the CTE of the die is 2.7 ppm/C less than that of the substrate as admitted by applicant (Applicant Spec p.10-11).

Response to Arguments

14. Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Mitchell whose telephone number is (703) 305-0244. The examiner can normally be reached on M-F 10:30-8:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (703) 308-1233. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.



Jmm



DAVID E. GRAYBILL
PRIMARY EXAMINER